



## II. SUMMARY OF ACTIONS AND RECOMMENDATIONS

### A. Project Location

The study area for Section 100 is approximately nine miles long, extending north along I-95 from just south of the I-895(N) split on the northeast side of Baltimore City, to the New Forge Road overpass in Baltimore County, just north of the MD 43 interchange (**Figure II-1**). The study area includes the I-895(N), I-695, and MD 43 interchanges, as well as the mainline of I-95, and extends approximately 0.25 miles out from the edge of the existing right-of-way (**Figure II-2**).

### B. Purpose and Need

#### 1. Identification in Master Plan

The Authority, in cooperation with the FHWA and the Maryland Department of Transportation (MDOT), developed the I-95 Master Plan study to comprehensively identify long-range transportation needs that establish clear goals for system maintenance, preservation and enhancement, and ensure the development of environmentally sensitive and intermodal-friendly solutions for the John F. Kennedy Memorial Highway (JFK).

The Authority adopted the I-95 Master Plan in April 2003. It identified four independent projects, including:

Section 100: I-95, I-895 (N) Split to North of MD 43

Section 200: North of MD 43 to North of MD 22

Section 300: North of MD 22 to North of MD 222

Section 400: North of MD 222 to the Delaware State Line

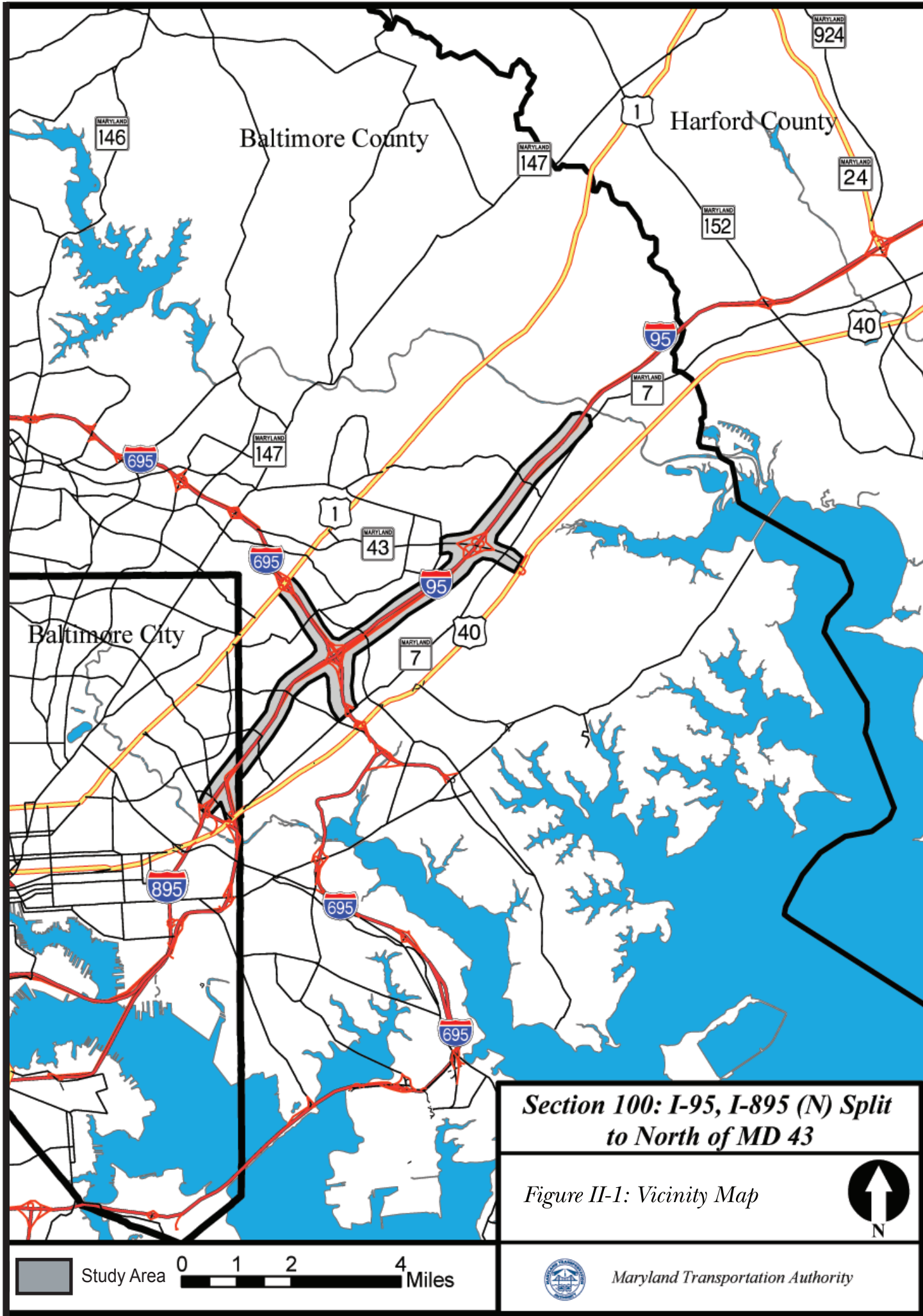
Throughout the I-95 Master Plan process, the Authority coordinated with local, State, and Federal regulatory and resource agencies. This coordination resulted in agency concurrence on the need for four independent projects and their termini, consistent with 23 CFR 771.111(f), as well as the concepts to be carried forward for each. Concurring agencies included the FHWA, EPA, USACE, NMFS, MDE, and DNR. The Master Plan was presented to the public at a series of three public workshops on June 5, 2001, June 21, 2001 and November 19, 2002. Section 100 is the first of the independent projects identified in the I-95 Master Plan to be initiated.

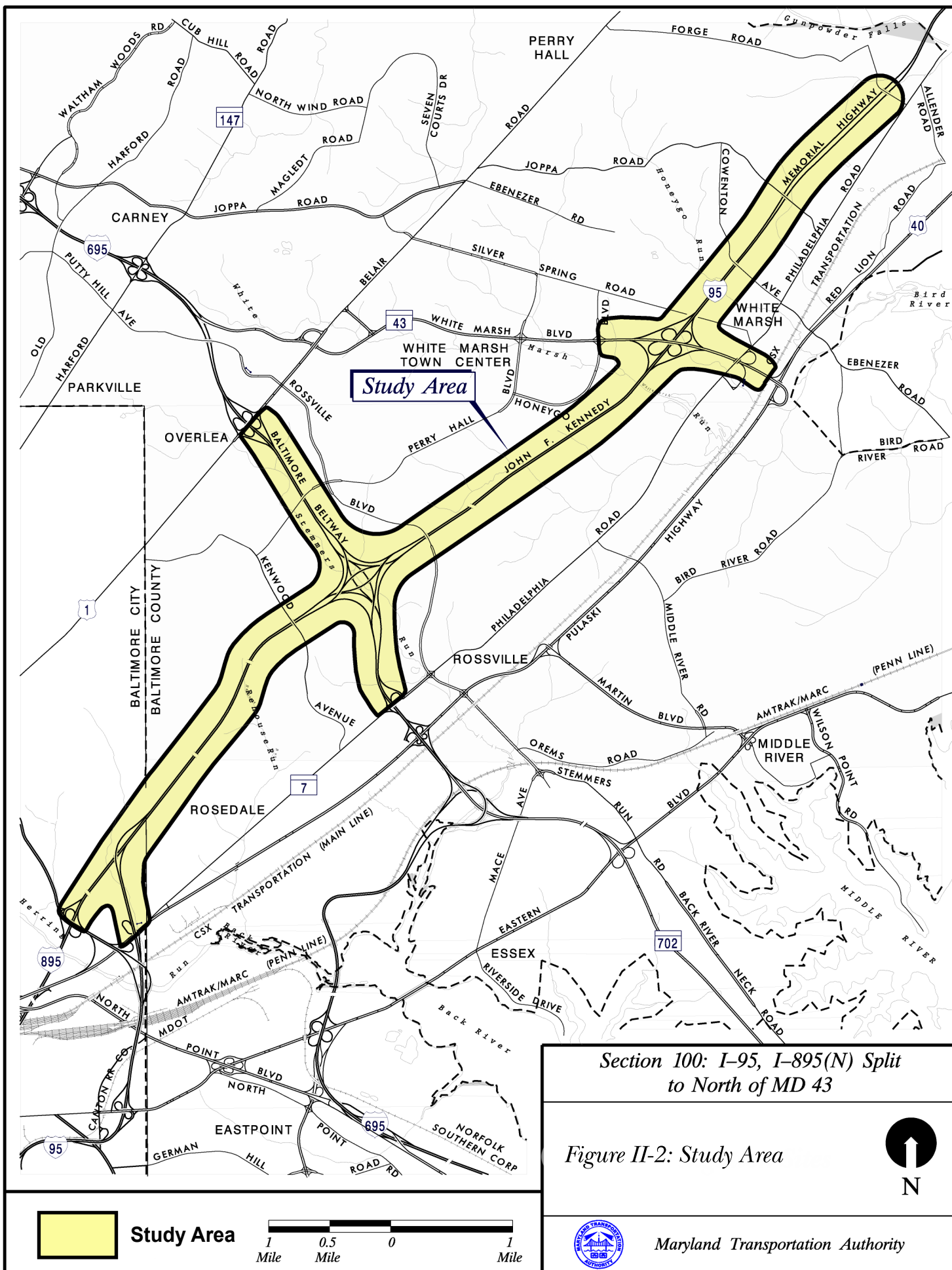
#### 2. Purpose of the Project

The purpose of the proposed action is to address capacity and safety needs on Section 100 and thereby improve access, mobility, and safety for local, regional, and inter-regional traffic, including passenger, freight, and transit vehicles.

#### 3. Need for the Project

The proposed action is intended to address the following capacity and safety needs on Section 100:







### Capacity

Section 100 is the most congested section of I-95 in Maryland north of Baltimore City. Currently, Section 100 south of MD 43 operates at LOS F during the morning and evening rush hours. If capacity needs are not addressed, congestion is expected to increase by the horizon year of 2025. By 2025, Section 100 south of MD 43 is also expected to operate at LOS E and F during weekend peak periods. Unchecked, increased congestion levels would extend the existing peak hour into a peak period of several hours in duration and increase the level of diversion to alternate routes, such as the community-oriented arterials US 1, US 40, and MD 7.

### Safety

The accident rate on Section 100 is currently lower than the statewide average for comparable urban interstates within Maryland. However, the total number of accidents on Section 100 is increasing, especially in the vicinity of the urban I-895, I-695, and MD 43 interchanges, where large volumes of merging, diverging, and weaving movements occur. At some locations, left-hand exit and entrance treatments, limited auxiliary lane lengths, and restricted sight distances may increase the potential for accidents. The majority of the reported accidents in Section 100 are of the types normally identified as congestion-related, such as rear-end and sideswipe. If the anticipated congestion levels in Section 100 are not addressed, an increase in the number and severity of congestion-related accidents would likely occur.

The Purpose and Need section in the EA provides additional information about the capacity and safety issues related to Section 100.

## **C. Alternates Retained for Detailed Study (ARDS)**

Based upon the detailed analyses used to evaluate the alternates and the input gathered from the Focus Group and the November 18, 2003 Public Workshop, three alternates were recommended for detailed study in the EA. The following summarizes each of the ARDS as evaluated in the May 2004 EA.

### **1. Alternate 1 - No-Build**

The No-Build Alternate would be restricted to normal maintenance and safety improvements. There would be no increase in roadway capacity, and I-95 would remain four lanes in each direction from the I-895(N) split to approximately the New Forge Road overpass. As a result, LOS would continue to degrade, and there would be no reduction in the accident rate. This alternate was carried as a baseline for comparison.

### **2. Alternate 2 - General Purpose Lanes**

The General Purpose Lanes Alternate involved additional general purpose lanes to accommodate the projected traffic demand. In order to reach a peak hour/peak direction LOS E through the design year, this alternate consisted of the following lane configurations:

- Four lanes in each direction on I-95 from approximately ¼ mile south of the I-895 interchange to the point where I-95 merges with I-895,
- Six lanes in each direction between the I-895(N) split and MD 43,
- North of MD 43, the roadway would transition from six lanes in each direction to the existing four lanes in each direction,



The Alternates Considered section in the EA discussed the configurations considered for the I-895, I-695, and MD 43 interchanges for the General Purpose Lanes Alternate.

### **3. Alternate 3 - Managed Lanes**

As described in the EA, the Managed Lanes Alternate involved two managed lanes in each direction from I-895 to north of MD 43, plus additional general purpose lanes (**Appendix A**). The managed lanes would be separated from the general purpose lanes by a physical barrier for the entire length of the project. Vehicles would access the managed lanes directly through dedicated managed lanes on-ramps and off-ramps located at the existing interchanges.

Additional improvements associated with the Managed Lanes Alternate included:

- Four general purpose lanes in each direction of I-95 from approximately ¼ mile south of the I-895 interchange to the point where I-95 merges with I-895,
- Two managed lanes and four general purpose lanes in each direction between the I-895(N) split and MD 43,
- North of MD 43, the roadway would transition from the six-lane section (two-lane managed and four-lane general purpose) in each direction into the existing four general purpose lanes in each direction)

The Alternates Considered section in the EA discussed the configurations considered for the I-895, I-695, and MD 43 interchanges for the Managed Lanes Alternate, and described the different management strategies that the Authority considered and that could be implemented in the managed lanes. The EA did not specify a management strategy for the managed lanes. Instead, the traffic modeling for this alternate evaluated three different scenarios for the managed lanes: “truck only,” “transit only,” and “priced strategies.”

In addition, the Interstate Access Point Approval (IAPA) Request report contains more information about the current interchange configurations. Specifically, the design of the I-695 interchange has been modified since the EA so that it now consists of four total levels rather than five. In the new configuration, the mainline of I-695 is on the bottom level, mainline I-95 is on the second level, and ramps occupy the two top levels. The change in design for I-695 is consistent with the ramp movements described in the EA, and substantially reduces the overall height of the proposed interchange, without increasing the footprint.

### **D. Preferred Alternate**

Three alternates were carried forward for detailed study: Alternate 1 – No Build; Alternate 2 – General Purpose Lanes; and Alternate 3 – Managed Lanes. After performing engineering and environmental analysis for each of these alternates and considering public and agency input, the Authority selected Alternate 3 – Managed Lanes as its Preferred Alternate. The Authority considered priced and non-priced management strategies for the Managed Lanes Alternate. Following analysis of multiple variations of each type of management strategy, the Authority selected a priced management strategy as the management strategy for the Managed Lanes Alternate.



Alternate 1 (No Build) was not selected because it does not satisfy the purpose and need of the project. Minor improvements for normal traffic maintenance and safety operations proposed under Alternate 1 would not improve the safety or capacity along Section 100.

Having eliminated the No Build Alternate, the Authority compared the General Purpose Lanes Alternate and the Managed Lanes Alternate based upon the following evaluation criteria: (i) ability to meet Purpose and Need, (ii) environmental impacts, (iii) operational efficiency, and (iv) cost. The overall results of this comparison demonstrate that the Managed Lanes Alternate (with ETLs) would more effectively meet these criteria, as explained below.

## **1. Ability to Meet Purpose and Need**

### **a. Congestion**

Both the General Purpose Lanes Alternate and the Managed Lanes Alternate (with ETLs) would provide better congestion relief than the No Build Alternate, by adding new capacity to Section 100. The Managed Lanes Alternate (with ETLs) also preserves a portion of the new capacity, the managed lanes, for priority needs by providing opportunities for vehicles that use the managed lanes to maintain generally free flow speeds. Managed lanes could establish stable travel speeds and vehicle spacing, thus maximizing vehicle throughput on the highway.

The General Purpose Lanes Alternate would operate at a weekday peak of LOS E. Although this alternate would provide acceptable overall traffic operations for weekday and weekend peak periods, it limits the ability to manage the facility. The six continuous travel lanes with no separation between the lanes would make it very difficult to implement a travel demand management program especially from an enforcement standpoint. Overtime, the General Purpose Lanes Alternate would experience increasing congestion levels on all lanes of travel since there would be limited opportunities for travel demand management programs. Additionally, there would be limited incentive for transit or carpooling.

The Managed Lanes Alternate (with ETLs) provides the opportunity to implement a travel demand management system that would in turn provide superior service for motorists that use the managed lanes. With a priced management strategy in place, the managed lanes are anticipated to operate at or above LOS D during weekday peak periods. This free flow of traffic will better provide for the safe and efficient movement of people and goods across all transportation modes. One of the keys to the success of the managed lanes concept is the ability to alter the manner in which the lanes are priced in ways that keep traffic flowing. The managed lanes also provide flexibility for the lanes to be used in situations where isolated incidents such as major accidents or other events block the movement of traffic.

Under the Managed Lanes Alternate, the operation of the managed lanes would influence the LOS for the general purpose lanes by affecting the number of trips made during a non-peak period of travel and/or a change in travel modes. By 2025, the general purpose lanes of the Managed Lanes Alternate would operate at LOS E or worse during AM peak periods along southbound I-95 and PM peak periods along northbound I-95 (**Table II-1**). The general purpose lanes would be somewhat more congested under the Managed Lanes Alternate than they would be under the General Purpose Lanes Alternate. However, under the Managed Lanes Alternate,



the users of the general purpose lanes would have the option of using the less congested managed lanes for time-sensitive trips.

Table II-1. Weekday 2025 LOS Summary

Alternate	Roadway Section		AM Peak Period		PM Peak Period	
			NB	SB	NB	SB
No-Build	I-895 to I-695		D	F	F	D
	I-695 to MD 43		D	F	F	E
General Purpose Lanes	I-895 to I-695		B	E	E	C
	I-695 to MD 43		C	E	E	C
Managed Lanes	I-895 to I-695	ML	A	D	D	A
	I-895 to I-695	GP	C	E	E	D
	I-695 to MD 43	ML	A	C	D	A
	I-695 to MD 43	GP	C	E	E	D

## b. Safety

The Managed Lanes Alternate would have fewer contiguous lanes than the General Purpose Lanes Alternate. The Managed Lanes Alternate would have four contiguous general purpose lanes and two contiguous managed lanes. The General Purpose Lanes Alternate would have six contiguous lanes. With fewer contiguous lanes, the Managed Lanes Alternate would decrease the number of lanes that a driver would have to traverse and limit the amount of weaving when exiting and entering the roadway. The six contiguous lanes provided in the General Purpose Lanes Alternate would increase the number of lanes a driver must cross to exit the roadway. Also, the distance a disabled vehicle would have to travel to the shoulder would increase. Therefore, it is expected that the number of accidents related to these types of movements would be less with the Managed Lanes Alternate (with ETLs) as compared to the General Purpose Lanes Alternate.

## 2. Environmental Impacts

### a. Natural and Human Environment

The General Purpose Lanes Alternate has a slightly smaller footprint than the Managed Lanes Alternate, and thus would have a proportionally smaller direct impact on the natural and human environment. Notwithstanding this slight difference in footprint, the Managed Lanes Alternate could provide environmental benefits that would not be provided by the General Purpose Lanes Alternate. A long-term benefit of the Managed Lanes Alternate is that appropriate management of the managed lanes could cause motorists to modify travel behavior, thus reducing the need for future highway widening and its associated environmental impacts. The Managed Lanes Alternate would cause short-term environmental benefits as well, such as reducing vehicle emissions by creating a managed transportation facility that maintains stable travel speeds.

### b. Land Use Impacts

In 2004, the Maryland Department of Planning (MDP) employed a land use analysis methodology to estimate the impact of the General Purpose Lanes Alternate and the Managed Lanes Alternate on household location in 2025. This pilot methodology, which was specifically



developed for the Section 100 project, provides a preliminary analysis of potential residential development rates for the study area. This analysis assumed the use of pricing as the management strategy for the managed lanes.

The findings of MDP's transportation and land use analysis indicate that both the General Purpose Lanes and Managed Lanes Alternates would contribute to land use/residential development rates in Harford County and eastern Baltimore County. As compared to the General Purpose Lanes Alternate, the Managed Lanes Alternate would generally have a slower rate of residential development in both counties.

By 2025, the General Purpose Lanes Alternate would result in more residential development in areas outside of Priority Funding Areas along the I-95, MD 543, and MD 152 corridors than the Managed Lanes Alternate. The General Purpose Lanes Alternate would also result in a faster rate of development in rural areas of northern and eastern Harford County. It is anticipated that the Managed Lanes Alternate would produce a lower rate of residential development in non-Priority Funding Areas of Baltimore and Harford Counties than the General Purpose Lanes Alternate through 2025, without changing the currently designated geographical pattern of residential development in the region.

The MDP concluded that the modeled differences in development rates can be attributed to the fact that as the apparent cost and time of travel increase, demand for residential development decreases. Compared to the General Purpose Lanes Alternate, the Managed Lane Alternate would generate an added cost of tolls or/and a slightly higher congestion delay in the general purpose lanes, resulting in impedance to travelers and decreased residential development pressure.

### **3. Operational Efficiency**

#### **a. Incident Management**

The Managed Lanes Alternate (with ETLs) offers a greater benefit than the General Purpose Lanes Alternate for incident management. First, physical separation of the general purpose and managed lanes of the Managed Lanes Alternate would provide adjacent detour routing and/or access for emergency services during traffic-related and other incidents. In addition, the managed lanes would provide emergency responders with unimpeded access throughout Section 100, because the managed lanes would operate at LOS D or better. Furthermore, by having a maximum of four contiguous lanes (general purpose) and additional shoulders associated with the managed lanes, additional areas would be available for crews to work and safely access necessary sites. The General Purpose Lanes Alternate would not provide these incident management benefits.

#### **b. Facility Maintenance**

The Managed Lanes Alternate (with ETLs) is preferable to the General Purpose Lanes Alternate in terms of facility maintenance. The Managed Lanes Alternate would allow vehicles to avoid areas where maintenance activities are taking place by using lanes that are separated from the maintenance activities. Because the General Purpose Lanes Alternate does not include such separation, it would not be possible for vehicles to use a separated roadway during maintenance activities. The Managed Lanes Alternate provides the additional benefits of only requiring



minimal efforts and materials to redirect traffic, and enhancing worker safety due to the concrete barrier that would separate workers from the traffic.

#### **c. Intermodal Access**

Section 100 provides access to the Port of Baltimore, Baltimore Washington International (BWI) and Martin State Airports, Amtrak rail service, and the local transit system. In order to provide dependable intermodal connectivity, it is important that highway travel times remain fairly consistent, and that those times be perceived as reasonable by users. Based upon the flexibility afforded by the Managed Lanes Alternate, a facility operator has the ability to consistently manage traffic volumes to provide travel speeds and travel times with a high degree of certainty. It is anticipated that the managed lanes would operate at LOS D or better, thereby providing faster, more consistent travel conditions as compared to the General Purpose Lanes Alternate, which would operate at LOS E during weekday peak periods and which do not include any mechanisms to assure consistent travel times – and would thus provide a much lower level of predictability and reliability for freight shippers and transit providers. The more predictable travel times associated with the Managed Lanes Alternate would create advantages for transport fleets with schedules to meet, such as those engaged in transit services or commercial “just in time” freight delivery services.

#### **d. Facilitation of Transit Service**

While the General Purpose Lanes Alternate would involve the addition of lanes to accommodate projected traffic volumes, this alternate would only have a moderate effect on bus transit in the Section 100 corridor. This is because all travelers, including transit services, would experience decreasing benefits as traffic volumes grow over time. The General Purpose Lanes Alternate would not provide a way for transit vehicles to avoid increasing congestion. Thus, transit vehicles would experience the same increase in the level of traffic congestion as general traffic, and there would likely be no incentives for bus usage due to a lack of variation in travel time from non-transit vehicles.

Bus transit could benefit from the implementation and use of managed lanes. Managed lane strategies preserve a portion of the highway capacity for priority needs by providing opportunities for vehicles to maintain generally free-flow travel speeds on designated lanes. Using the managed lanes, buses would benefit from the higher level of service that would be provided in these managed lanes. This would improve the attractiveness of transit services by providing reliable and predictable transit service times. Therefore, by implementing managed lanes, bus ridership would likely increase. As documented in the EA, preliminary indications are that a 6% increase in ridership would occur.

#### **4. Cost**

Both the General Purpose Lanes Alternate and the Managed Lanes Alternate would be funded by the Authority from toll revenues, which are drawn from I-95 and other facilities owned by the Authority. Sufficient funds have been budgeted by the Authority to cover the cost of construction for either of these build alternates.

The preliminary cost estimate for the General Purpose Lanes Alternate is approximately \$558.5M, while the preliminary cost estimate for the Managed Lanes Alternate is approximately \$824.6M. These preliminary costs do not include right-of-way (ROW) or mitigation costs. The



estimated cost for the General Purpose Lanes Alternate's additional ROW (i.e. seven displacements and 140 parcels) and mitigation is approximately \$12M. The estimated cost for the Managed Lanes Alternate's additional ROW (i.e. seven displacements and 210 parcels) and mitigation is approximately \$22M.

While the Managed Lanes Alternate has a higher cost, it also will provide an additional revenue source – the tolls collected from the managed lanes. The revenues from these priced lanes would help offset the cost to construct and manage the facility.

### **E. Management Strategy for the Preferred Alternate**

The Authority has determined that the Managed Lanes Alternate will be managed as a priced facility utilizing Express Toll Lanes (ETLs) with variable or dynamic pricing. Following the NEPA process, the Authority will set the specific pricing method and toll rates for the facility. The Authority's analysis supporting the selection of a priced management strategy is included as Appendix B.

#### **1. Analysis of Management Strategies in the EA.**

The EA evaluated a range of management strategies for Section 100. The strategies, which included truck only, transit only and priced, were representative examples of the types of management strategies that could be used on Section 100.

On January 19, 2005, the Authority circulated the PACM to the resource agencies for concurrence. The PACM identified the Managed Lanes Alternate as the preferred alternate for the Section 100 project. While the PACM identified a preferred alternate, it did not identify the management strategy that would be used for the managed lanes. Thus, as in the EA, the traffic analysis of the Managed Lanes Alternate in the PACM consisted of a range or levels of service based upon the various management strategies.

#### **2. The Authority's Selection of a Management Strategy**

Following issuance of the PACM, the Authority undertook additional analysis of the potential management strategies (Appendix B). This analysis assessed the advantages and disadvantages of the management strategies considered in the EA and PACM. Based upon this analysis, on October 2004, the Authority selected the priced management strategy utilizing ETLs with variable or dynamic pricing as the management strategy that it intended to use on the managed lanes of the Section 100 project. Based upon the management strategy analysis, the Authority also concluded that utilizing ETLs as the management strategy would not result in impacts that are different than the impacts from managed lanes that were studied and documented in the EA. On March 10, 2005, the Authority consulted with FHWA on its management strategy selection, and requested that FHWA approve the Managed Lanes Alternate with a priced management strategy utilizing ETLs in this FONSI.

In determining the best management strategy for the Managed Lanes, the Authority considered the following factors: (1) optimized operational efficiency, (2) safety, (3) congestion management, and (4) revenue production. The Authority determined that the use of ETLs with a variable or dynamic pricing method would allow for a more effective use of the facility. The general purpose lanes would operate at a level of service 'E' for the most part while the managed lanes will operate at a level of service 'D' or better. The non-pricing management strategies



(truck only and transit only lanes) during the peak periods cause the general purpose lanes to operate at level of service 'F'. The two managed lanes would operate at level of service 'A' or 'B', thereby not effectively using the entire facility. While these non-priced management strategies have not been selected, the Authority has determined that transit vehicles would be permitted in the managed lanes.

The two pricing management strategies considered by the Authority were variable pricing and dynamic pricing. Variable pricing allows toll rates to be set based upon identified conditions such as time of day or days of the week. Under variable pricing, toll rates would likely be higher in the peak direction during the peak hours (i.e. AM southbound and PM northbound) than during other periods of the week. Toll rates could also take into account peak driving times such as summer and holiday weekends. Dynamic pricing allows the toll rate to adjust quickly – in a predefined number of minutes – as conditions in the general purpose lanes reach an identified level of congestion. This allows for an immediate increase in rates as congestion increases in the general purpose lanes. The dynamic pricing method of ETL management is the most costly initially and to maintain, but offers the opportunity to maximize revenues and maintain LOS D or better in the managed lanes.